

SEQUENCE LISTING

<110> Huang, Shi
Chadwick, Robert B.

<120> Methods of Detecting and Treating
Microsatellite-Instability Positive Tumors Using RIZ

<130> P-LJ 5101

<150> US 60/256,582
<151> 2000-12-19

<160> 15

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Thr Arg Ile Gly Val Trp Ala Thr Lys Pro Ile Leu Lys Gly Lys Lys
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Phe Gly Pro Phe Val Gly Asp Lys Lys Lys Arg Ser Gln Val Arg Asn
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Trp Ala Cys Ser Gly Glu Glu Gln Asn Leu Phe Pro Leu Glu Ile Asn
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Pro Leu Ala Ser Ala Pro Glu Gln Pro Ala Pro Leu Pro Glu Val Gly
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Thr Asp Thr Val Leu Thr Ser Lys Lys Pro Lys Leu Glu Ser Arg Ser			
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920

925

930

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Pro Thr Val Pro Leu Ser His Pro Ser Ser Asp Ala Ser Pro Gln Gln
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Cys Pro Ser Pro Phe Ser Asn Thr Thr Ala Gln Ser Pro Leu Pro Ile
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Leu Ser Pro Thr Val Ser Pro Ser Pro Ser Pro Ile Pro Pro Val Glu
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Val Cys Glu Ser Pro Phe Leu Ser Ile Lys Asp Leu Thr Lys His Leu
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gaa gag ctt tac acg acc atc aaa ata atg gct tct gga ata aag acg Glu Glu Leu Tyr Thr Thr Ile Lys Ile Met Ala Ser Gly Ile Lys Thr	1255	1260	1265	3966
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gtg aca gcc acc aac ttc acc acc cac aat att cca cag act ttc act Val Thr Ala Thr Asn Phe Thr Thr His Asn Ile Pro Gln Thr Phe Thr	1305	1310	1315	4110
act gcc atc cgc tgc aca aag tgt ggg aag ggc gtc gac aat atg cct Thr Ala Ile Arg Cys Thr Lys Cys Gly Lys Gly Val Asp Asn Met Pro	1320	1325	1330	4158
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35 40 45
Ile Leu Lys Gly Lys Lys Phe Gly Pro Phe Val Gly Asp Lys Lys Lys
50 55 60
Arg Ser Gln Val Arg Asn Asn Val Tyr Met Trp Glu Val Tyr Tyr Pro
65 70 75 80
Asn Leu Gly Trp Met Cys Ile Asp Ala Thr Asp Pro Glu Lys Gly Asn
85 90 95
Trp Leu Arg Tyr Val Asn Trp Ala Cys Ser Gly Glu Glu Gln Asn Leu
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Phe Pro Leu Glu Ile Asn Arg Ala Ile Tyr Tyr Lys Thr Leu Lys Pro
115 120 125
Ile Ala Pro Gly Glu Glu Leu Leu Val Trp Tyr Asn Gly Glu Asp Asn
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Pro Glu Ile Ala Ala Ala Ile Glu Glu Glu Arg Ala Ser Ala Arg Ser
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Lys Arg Ser Ser Pro Lys Ser Arg Arg Gly Lys Lys Lys Ser His Glu
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Lys Glu Glu Asp Glu Arg Pro Leu Ala Ser Ala Pro Glu Gln Pro Ala
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Pro Leu Pro Ala Cys Glu Pro Gln Pro Glu Val Asp Gly Lys Gln Glu
245 250 255
Val Thr Asp Cys Glu Val Asn Asp Val Glu Glu Glu Leu Glu Glu
260 265 270
Glu Glu Glu Leu Glu Glu Glu Glu Glu Glu Leu Gly Glu Asp Gly
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Val Glu Glu Ala Asp Met Pro Asn Glu Ser Ser Ala Lys Glu Pro Glu
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Ile Arg Cys Glu Glu Lys Pro Glu Asp Leu Leu Glu Glu Pro Gln Ser
305 310 315 320
Met Ser Asn Glu Ala Arg Glu Asp Ser Pro Asp Val Thr Pro Pro Pro
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His Thr Pro Arg Ala Arg Glu Glu Ala Asn Gly Asp Val Leu Glu Thr
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Phe Met Phe Pro Cys Gln His Cys Glu Arg Lys Phe Ala Thr Lys Gln

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Val Thr Ser Lys Asp Glu Ser Ser Pro Pro Gln Leu Gly Gln Asp Cys		
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Leu Ile Leu Asn Ser Glu Lys Thr Ser Gln Glu Val Leu Asn Ser Ser		
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Phe Val Glu Glu Asn Gly Glu Val Lys Glu Leu His Pro Cys Lys Tyr		
465	470	475
Cys Lys Lys Val Phe Gly Thr His Thr Asn Met Arg Arg His Gln Arg		
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Arg Val His Glu Arg His Leu Ile Pro Lys Gly Val Arg Arg Lys Gly		
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Gly Leu Leu Glu Glu Pro Gln Pro Pro Ala Glu Gln Ala Pro Pro Ser		
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Gln Asn Val Tyr Val Pro Ser Thr Glu Pro Glu Glu Gly Glu Thr		
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Asp Asp Val Tyr Ile Met Asp Ile Ser Ser Asn Ile Ser Glu Asn Leu		
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Asn Tyr Tyr Ile Asp Gly Lys Ile Gln Thr Asn Ser Ser Thr Ser Asn		
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Cys Asp Val Ile Glu Met Glu Ser Asn Ser Ala His Leu Tyr Gly Ile		
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Asp Cys Leu Leu Thr Pro Val Thr Val Glu Ile Thr Gln Asn Ile Lys		
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Ser Thr Gln Val Ser Val Thr Asp Asp Leu Leu Lys Asp Ser Pro Ser		
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Ser Thr Asn Cys Glu Ser Lys Lys Arg Arg Thr Ala Ser Pro Pro Val		
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Leu Pro Lys Ile Lys Thr Glu Thr Glu Ser Asp Ser Thr Ala Pro Ser		
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Cys Ser Leu Ser Leu Pro Leu Ser Ile Ser Thr Ala Glu Val Val Ser		
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Phe His Lys Glu Lys Gly Val Tyr Leu Ser Ser Lys Leu Lys Gln Leu		
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Leu Gln Thr Gln Asp Lys Leu Thr Leu Pro Ala Gly Phe Ser Ala Ala		
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Leu Pro Val Thr Ser Ser Arg Phe Lys Arg Arg Thr Ser Ser Pro Pro		
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Ser Ser Pro Gln His Ser Pro Ala Leu Arg Asp Phe Gly Lys Pro Asn		
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Asp Gly Lys Ala Ala Trp Thr Asp Thr Val Leu Thr Ser Lys Lys Pro		
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Lys Leu Glu Ser Arg Ser Asp Ser Pro Ala Trp Ser Leu Ser Gly Arg		
770	775	780

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Ser Lys Glu Trp Ala Ala Ser Ser Thr Phe Ser Ser Val Cys Asn Gln
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Gln Pro Leu Asp Leu Ser Ser Gly Val Lys Gln Lys Ser Glu Gly Thr
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Lys Val Leu Leu Asn Glu Tyr Asn Gly Val Ser Leu Pro Thr Glu Thr
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Thr Pro Glu Val Thr Arg Ser Pro Ser Pro Cys Lys Ser Pro Asp Thr
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Gln Pro Asp Pro Glu Leu Gly Pro Asp Ser Ser Cys Ser Val Pro Thr
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Ala Glu Ser Pro Pro Glu Val Val Gly Pro Ser Ser Pro Pro Leu Gln
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Glu Pro Ser Ser Pro Pro Pro Cys Pro Pro Val Leu Thr Val Ala Thr
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Pro Pro Pro Pro Leu Leu Pro Thr Val Pro Leu Ser His Pro Ser Ser
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Asp Leu His Pro Asp Glu Val Cys Thr His His Glu Phe Glu Ser Gly

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Asn Pro Met Gly Ile Gly Val Thr Ala Thr Asn Phe Thr Thr His Asn		
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Ile Pro Gln Thr Phe Thr Thr Ala Ile Arg Cys Thr Lys Cys Gly Lys		
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Gly Val Asp Asn Met Pro Glu Leu His Lys His Ile Leu Ala Cys Ala		
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Ser Ala Ser Asp Lys Lys Arg Tyr Thr Pro Lys Lys Asn Pro Val Pro		
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Leu Lys Gln Thr Val Gln Pro Lys Asn Gly Val Val Val Leu Asp Asn		
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Ser Gly Lys Asn Ala Phe Arg Arg Met Gly Gln Pro Lys Arg Leu Ser		
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Phe Asn Val Glu Leu Gly Lys Met Ser Pro Asn Lys Leu Lys Leu Ser		
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Ala Leu Lys Lys Asn Gln Leu Val Gln Lys Ala Ile Leu Gln Lys		
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Ser Ser His Ile Cys Pro Tyr Cys Asp Arg Glu Phe Thr Tyr Ile Gly		
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Ser Leu Asn Lys His Ala Ala Phe Ser Cys Pro Lys Lys Pro Leu Ser		
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Pro Ser Lys Arg Lys Val Ser His Ser Ser Lys Lys Gly Gly His Ala		
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Lys Thr Arg Ala Arg Ser Thr Gly Pro Ala Gln Ala Ser Leu Pro Ser		
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Ser Ser Phe Arg Ser Arg Gln Asn Val Lys Phe Ala Ala Ser Val Lys		
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Ser Lys Lys Ala Ser Ser Ser Leu Arg Asn Ser Ser Pro Ile Arg		
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Met Ala Lys Ile Thr His Val Glu Gly Lys Lys Pro Lys Ala Val Ala		
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Lys Ser His Ser Ala Gln Leu Ser Ser Lys Ser Ser Arg Gly Leu His		
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Val Arg Val Gln Lys Ser Lys Ala Val Ile Gln Ser Lys Thr Ala Leu		
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Ala Ser Lys Arg Arg Thr Asp Arg Phe Ile Val Lys Ser Arg Glu Arg		
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atg aat cag aac act act gag cct gtg gcg gcc acc gag acc ctg gct 168
Met Asn Gln Asn Thr Thr Glu Pro Val Ala Ala Thr Glu Thr Leu Ala
1 5 10 15

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Glu Val Pro Glu His Val Leu Arg Gly Leu Pro Glu Glu Val Arg Leu
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Phe Pro Ser Ala Val Asp Lys Thr Arg Ile Gly Val Trp Ala Thr Lys
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Pro Ile Leu Lys Gly Lys Phe Gly Pro Phe Val Gly Asp Lys Lys
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Lys Arg Ser Gln Val Lys Asn Asn Val Tyr Met Trp Glu Val Tyr Tyr
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Pro Asn Leu Gly Trp Met Cys Ile Asp Ala Thr Asp Pro Glu Lys Gly
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Asn Trp Leu Arg Tyr Val Asn Trp Ala Cys Ser Gly Glu Glu Gln Asn
100 105 110

tta ttc cca ctg gaa atc aac aga gcc att tac tat aaa act tta aag 504

Leu Phe Pro Leu Glu Ile Asn Arg Ala Ile Tyr Tyr Lys Thr Leu Lys				
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cca atc gcg ccg ggc gag gag ctc ctg gtc tgg tac aat ggg gaa gac				552
Pro Ile Ala Pro Gly Glu Glu Leu Leu Val Trp Tyr Asn Gly Glu Asp				
130	135	140		
aac cct gag ata gca gct gcg att gag gaa gag cga gcc agc gcc cg				600
Asn Pro Glu Ile Ala Ala Ile Glu Glu Arg Ala Ser Ala Arg				
145	150	155	160	
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Ser Lys Arg Ser Ser Pro Lys Ser Arg Lys Gly Lys Lys Ser Gln				
165	170	175		
gaa aat aaa aac aaa gga aac aaa atc caa gac ata caa ctg aag aca				696
Glu Asn Lys Asn Lys Gly Asn Lys Ile Gln Asp Ile Gln Leu Lys Thr				
180	185	190		
agt gag cca gat ttc acc tct gca aat atg aga gat tct gca gaa ggt				744
Ser Glu Pro Asp Phe Thr Ser Ala Asn Met Arg Asp Ser Ala Glu Gly				
195	200	205		
cct aaa gaa gac gaa gag aag cct tca gcc tca gca ctt gag cag ccg				792
Pro Lys Glu Asp Glu Glu Lys Pro Ser Ala Ser Ala Leu Glu Gln Pro				
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gcc acc ctc cag gag gtg gcc agt cag gag gtg cct cca gaa cta gca				840
Ala Thr Leu Gln Glu Val Ala Ser Gln Glu Val Pro Pro Glu Leu Ala				
225	230	235	240	
acc cct gcc cct gcc tgg gag cca cag cca gaa cca gac gag cga tta				888
Thr Pro Ala Pro Ala Trp Glu Pro Gln Pro Glu Pro Asp Glu Arg Leu				
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Leu Glu Asp Glu Gly Glu Glu Ala Ser Met Pro Asn Glu Asn Ser				
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Val Lys Glu Pro Glu Ile Arg Cys Asp Glu Lys Pro Glu Asp Leu Leu				
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Glu Glu Pro Lys Thr Thr Ser Glu Glu Thr Leu Glu Asp Cys Ser Glu				

325

330

335

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Phe Thr Thr Lys Gln Gly Leu Glu Arg His Met His His Ile Ser
370 375 380

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Thr Val Asn His Ala Phe Lys Cys Lys Tyr Cys Gly Lys Ala Phe Gly
385 390 395 400

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Thr Gln Ile Asn Arg Arg His Glu Arg Arg His Glu Ala Gly Leu
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Lys Arg Lys Pro Ser Gln Thr Leu Gln Pro Ser Glu Asp Leu Ala Asp
420 425 430

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Pro Ser Leu Gly Pro Asp Cys Leu Ile Met Asn Ser Glu Lys Ala Ser
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Glu Leu His Pro Cys Lys Tyr Cys Lys Lys Val Phe Gly Thr His Thr
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Asn Met Arg Arg His Gln Arg Arg Val His Glu Arg His Leu Ile Pro
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Lys Gly Val Arg Arg Lys Gly Gly Leu Glu Glu Pro Gln Pro Pro Ala
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595 600 605

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610 615 620

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Pro Lys Glu Pro Leu Gly Ser Thr Asn Ser Glu Ala Lys Lys Arg Arg
625 630 635 640

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Thr Ala Ser Pro Pro Ala Leu Pro Lys Ile Lys Ala Glu Thr Asp Ser
645 650 655

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Thr Thr Glu Ala Val Ser Phe His Lys Glu Lys Ser Val Tyr Leu Ser
675 680 685

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690 695 700

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Ala Gly Ile Ser Ala Thr Glu Ile Ala Lys Leu Gly Pro Val Cys Val
705 710 715 720

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Ser Ala Pro Ala Ser Met Leu Pro Val Thr Ser Ser Arg Phe Lys Arg
725 730 735

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Arg Thr Ser Ser Pro Pro Ser Ser Pro Gln His Ser Pro Ala Leu Arg
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agc agt gtg tgc aac cag cag cca ctg gat tta tcc agc ggt gtc aaa Ser Ser Val Cys Asn Gln Gln Pro Leu Asp Leu Ser Ser Gly Val Lys	820	825	830	2616
cag aag gct gag ggt aca ggc aag act cca gtc cag tgg gaa tct gtc Gln Lys Ala Glu Gly Thr Gly Lys Thr Pro Val Gln Trp Glu Ser Val	835	840	845	2664
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Leu	Met	Ser	Ala	Ala	Ser	Pro	Gly	Pro	Pro	Thr	Leu	Ser	Ser	Ser	Ser	
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cca agc ttt aaa cca cct cca ttt cag tac cat cac cgt aac ccc atg Pro Ser Phe Lys Pro Pro Phe Gln Tyr His His Arg Asn Pro Met 1300	1305	1310	4056
ggg att ggt gtg aca gcc aca aat ttc act aca cac aat att cca cag Gly Ile Gly Val Thr Ala Thr Asn Phe Thr Thr His Asn Ile Pro Gln 1315	1320	1325	4104
act ttc act acc gcc att cgc tgc aca aag tgt gga aaa ggt gtc gac Thr Phe Thr Thr Ala Ile Arg Cys Thr Lys Cys Gly Lys Gly Val Asp 1330	1335	1340	4152
aat atg ccg gag ttg cac aaa cat atc ctg gct tgt gct tct gca agt Asn Met Pro Glu Leu His Lys His Ile Leu Ala Cys Ala Ser Ala Ser 1345	1350	1355	4200
gac aag aag agg tac acg cct aag aaa aac cca gta cca tta aaa caa Asp Lys Lys Arg Tyr Thr Pro Lys Lys Asn Pro Val Pro Leu Lys Gln 1365	1370	1375	4248
act gtgcaa ccc aaa aat ggc gtg gtg gtt tta gat aac tct ggg aaa Thr Val Gln Pro Lys Asn Gly Val Val Leu Asp Asn Ser Gly Lys 1380	1385	1390	4296

aat gcc ttc cga cga atg gga cag ccc aaa agg ctt aac ttt agt gtt 4344
Asn Ala Phe Arg Arg Met Gly Gln Pro Lys Arg Leu Asn Phe Ser Val
1395 1400 1405

gag ctc agc aaa atg tcg tcg aat aag ctc aaa tta aat gca ttg aag 4392
Glu Leu Ser Lys Met Ser Ser Asn Lys Leu Lys Leu Asn Ala Leu Lys
1410 1415 1420

aaa aaa aat cag cta gta cag aaa gca att ctt cag aaa aac aaa tct 4440
Lys Lys Asn Gln Leu Val Gln Lys Ala Ile Leu Gln Lys Asn Lys Ser
1425 1430 1435 1440

gca aag cag aag gcc gac ttg aaa aat gct tgt gag tca tcc tct cac 4488
Ala Lys Gln Lys Ala Asp Leu Lys Asn Ala Cys Glu Ser Ser His
1445 1450 1455

atc tgc cct tac tgt aat cga gag ttc act tac att gga agc ctg aat 4536
Ile Cys Pro Tyr Cys Asn Arg Glu Phe Thr Tyr Ile Gly Ser Leu Asn
1460 1465 1470

aaa cac gcc gcc ttc agc tgt ccc aaa aaa ccc ctt tct cct ccc aaa 4584
Lys His Ala Ala Phe Ser Cys Pro Lys Lys Pro Leu Ser Pro Pro Lys
1475 1480 1485

aaa aaa gtt tct cat tca tct aag aaa ggt gga cac tca tca cct gca 4632
Lys Lys Val Ser His Ser Ser Lys Lys Gly Gly His Ser Ser Pro Ala
1490 1495 1500

agt agt gac aaa aac agt aac agc aac cac cgc aga cgg aca gcg gat 4680
Ser Ser Asp Lys Asn Ser Asn His Arg Arg Arg Thr Ala Asp
1505 1510 1515 1520

gcg gag att aaa atg caa agc atg cag act ccg ttg ggc aag acc aga 4728
Ala Glu Ile Lys Met Gln Ser Met Gln Thr Pro Leu Gly Lys Thr Arg
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gcc cgc agc tca ggc ccc acc caa gtc cca ctt ccc tcc tca tcc ttc 4776
Ala Arg Ser Ser Gly Pro Thr Gln Val Pro Leu Pro Ser Ser Phe
1540 1545 1550

agg tcc aag cag aac gtc aag ttt gca gct tcg gtg aaa tcc aaa aaa 4824
Arg Ser Lys Gln Asn Val Lys Phe Ala Ala Ser Val Lys Ser Lys Lys
1555 1560 1565

cca agc tcc tcc tct tta agg aac tcc agc ccg ata aga atg gcc aaa 4872
Pro Ser Ser Ser Leu Arg Asn Ser Ser Pro Ile Arg Met Ala Lys
1570 1575 1580

ata act cat gtt gag ggg aaa aaa cct aaa gct gtg gcc aag aat cat 4920
Ile Thr His Val Glu Gly Lys Lys Pro Lys Ala Val Ala Lys Asn His
1585 1590 1595 1600

tct gct cag ctt tcc agc aaa aca tcg cgg agc ctg cac gtg agg gta Ser Ala Gln Leu Ser Ser Lys Thr Ser Arg Ser Leu His Val Arg Val	1605	1610	1615	4968
cag aaa agc aaa gct gtt tta caa agc aaa tcc acc ttg gcg agt aag Gln Lys Ser Lys Ala Val Leu Gln Ser Lys Ser Thr Leu Ala Ser Lys	1620	1625	1630	5016
aaa aga aca gac cgg ttc aat ata aaa tct aga gag cgg agt ggg ggg Lys Arg Thr Asp Arg Phe Asn Ile Lys Ser Arg Glu Arg Ser Gly Gly	1635	1640	1645	5064
cca gtc acc cgg agc ctt cag ctg gca gct gct gac ttg agt gag Pro Val Thr Arg Ser Leu Gln Leu Ala Ala Ala Asp Leu Ser Glu	1650	1655	1660	5112
aac aag aga gag gac ggc agc gcc aag cag gag ctg aag gac ttc agc Asn Lys Arg Glu Asp Gly Ser Ala Lys Gln Glu Leu Lys Asp Phe Ser	1665	1670	1675	5160
tac agc ctc cgc ttg gcg tcc cga tgc tct cca cca gcc gcc tct tac Tyr Ser Leu Arg Leu Ala Ser Arg Cys Ser Pro Pro Ala Ala Ser Tyr	1685	1690	1695	5208
atc acc agg cag tat agg aag gtc aaa gct ccg gct gca gcc cag ttc Ile Thr Arg Gln Tyr Arg Lys Val Lys Ala Pro Ala Ala Ala Gln Phe	1700	1705	1710	5256
cag gga cca ttc ttc aaa gag tagacactct ggctgctccc tgacagcacc Gln Gly Pro Phe Phe Lys Glu	1715			5307
tgaagtgacc tggaaatcagt gaagccaaag ggactggcag tctgcctgca gggagtaccg acctatccca gttgtgttag gctgcgagag aaaggaggatg catgtgcgcg cgtcatgtg tgcgtgcgtg tgggttcacg tgggttcgtg cggggcgtga gtggcttca aacgagggtc ccgaaccccg gggcggcagg aagggggccc actccacgct gtcctttggg atgatacttg gatgtcagct cttggaccg tggatgcagc ccagccttcc tgggtgggtg gggcctctcc tactatgca ttttcaaga gtccttgac cctgcgtttt gtttgcgttggat ttgtctttg ccattatggg gactttgggtt tgacccaggg gtcagccctt taggaaggcc ttcaggagga ggccgagttc cccttcagta ccacccctct ctccccacct gcccgtccc ggcaacatct ctggaaatca acagcatatt gacacgttgg agccgagcct gaacatgccc tgaccccagc acatggaaaa ccccccttcct t				5367
				5427
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<211> 1719
<212> PRT
<213> Homo sapien

<400> 4
Met Asn Gln Asn Thr Thr Glu Pro Val Ala Ala Thr Glu Thr Leu Ala
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Glu Val Pro Glu His Val Leu Arg Gly Leu Pro Glu Glu Val Arg Leu
20 25 30

Phe Pro Ser Ala Val Asp Lys Thr Arg Ile Gly Val Trp Ala Thr Lys
35 40 45
Pro Ile Leu Lys Gly Lys Lys Phe Gly Pro Phe Val Gly Asp Lys Lys
50 55 60
Lys Arg Ser Gln Val Lys Asn Asn Val Tyr Met Trp Glu Val Tyr Tyr
65 70 75 80
Pro Asn Leu Gly Trp Met Cys Ile Asp Ala Thr Asp Pro Glu Lys Gly
85 90 95
Asn Trp Leu Arg Tyr Val Asn Trp Ala Cys Ser Gly Glu Glu Gln Asn
100 105 110
Leu Phe Pro Leu Glu Ile Asn Arg Ala Ile Tyr Tyr Lys Thr Leu Lys
115 120 125
Pro Ile Ala Pro Gly Glu Leu Leu Val Trp Tyr Asn Gly Glu Asp
130 135 140
Asn Pro Glu Ile Ala Ala Ile Glu Glu Glu Arg Ala Ser Ala Arg
145 150 155 160
Ser Lys Arg Ser Ser Pro Lys Ser Arg Lys Gly Lys Lys Lys Ser Gln
165 170 175
Glu Asn Lys Asn Lys Gly Asn Lys Ile Gln Asp Ile Gln Leu Lys Thr
180 185 190
Ser Glu Pro Asp Phe Thr Ser Ala Asn Met Arg Asp Ser Ala Glu Gly
195 200 205
Pro Lys Glu Asp Glu Glu Lys Pro Ser Ala Ser Ala Leu Glu Gln Pro
210 215 220
Ala Thr Leu Gln Glu Val Ala Ser Gln Glu Val Pro Pro Glu Leu Ala
225 230 235 240
Thr Pro Ala Pro Ala Trp Glu Pro Gln Pro Glu Pro Asp Glu Arg Leu
245 250 255
Glu Ala Ala Ala Cys Glu Val Asn Asp Leu Gly Glu Glu Glu Glu
260 265 270
Glu Glu Glu Asp Glu Glu Glu Glu Asp Asp Asp Asp Asp Glu
275 280 285
Leu Glu Asp Glu Gly Glu Glu Ala Ser Met Pro Asn Glu Asn Ser
290 295 300
Val Lys Glu Pro Glu Ile Arg Cys Asp Glu Lys Pro Glu Asp Leu Leu
305 310 315 320
Glu Glu Pro Lys Thr Thr Ser Glu Glu Thr Leu Glu Asp Cys Ser Glu
325 330 335
Val Thr Pro Ala Met Gln Ile Pro Arg Thr Lys Glu Glu Ala Asn Gly
340 345 350
Asp Val Phe Glu Thr Phe Met Phe Pro Cys Gln His Cys Glu Arg Lys
355 360 365
Phe Thr Thr Lys Gln Gly Leu Glu Arg His Met His Ile His Ile Ser
370 375 380
Thr Val Asn His Ala Phe Lys Cys Lys Tyr Cys Gly Lys Ala Phe Gly
385 390 395 400
Thr Gln Ile Asn Arg Arg Arg His Glu Arg Arg His Glu Ala Gly Leu
405 410 415
Lys Arg Lys Pro Ser Gln Thr Leu Gln Pro Ser Glu Asp Leu Ala Asp
420 425 430
Gly Lys Ala Ser Gly Glu Asn Val Ala Ser Lys Asp Asp Ser Ser Pro
435 440 445
Pro Ser Leu Gly Pro Asp Cys Leu Ile Met Asn Ser Glu Lys Ala Ser

450	455	460
Gln Asp Thr Ile Asn Ser Ser Val Val Glu Glu Asn Gly Glu Val Lys		
465	470	475
Glu Leu His Pro Cys Lys Tyr Cys Lys Lys Val Phe Gly Thr His Thr		480
485	490	495
Asn Met Arg Arg His Gln Arg Arg Val His Glu Arg His Leu Ile Pro		
500	505	510
Lys Gly Val Arg Arg Lys Gly Gly Leu Glu Glu Pro Gln Pro Pro Ala		
515	520	525
Glu Gln Ala Gln Ala Thr Gln Asn Val Tyr Val Pro Ser Thr Glu Pro		
530	535	540
Glu Glu Glu Gly Glu Ala Asp Asp Val Tyr Ile Met Asp Ile Ser Ser		
545	550	555
Asn Ile Ser Glu Asn Leu Asn Tyr Tyr Ile Asp Gly Lys Ile Gln Thr		560
565	570	575
Asn Asn Asn Thr Ser Asn Cys Asp Val Ile Glu Met Glu Ser Ala Ser		
580	585	590
Ala Asp Leu Tyr Gly Ile Asn Cys Leu Leu Thr Pro Val Thr Val Glu		
595	600	605
Ile Thr Gln Asn Ile Lys Thr Thr Gln Val Pro Val Thr Glu Asp Leu		
610	615	620
Pro Lys Glu Pro Leu Gly Ser Thr Asn Ser Glu Ala Lys Lys Arg Arg		
625	630	635
Thr Ala Ser Pro Pro Ala Leu Pro Lys Ile Lys Ala Glu Thr Asp Ser		640
645	650	655
Asp Pro Met Val Pro Ser Cys Ser Leu Ser Leu Pro Leu Ser Ile Ser		
660	665	670
Thr Thr Glu Ala Val Ser Phe His Lys Glu Lys Ser Val Tyr Leu Ser		
675	680	685
Ser Lys Leu Lys Gln Leu Leu Gln Thr Gln Asp Lys Leu Thr Pro Pro		
690	695	700
Ala Gly Ile Ser Ala Thr Glu Ile Ala Lys Leu Gly Pro Val Cys Val		
705	710	715
Ser Ala Pro Ala Ser Met Leu Pro Val Thr Ser Ser Arg Phe Lys Arg		720
725	730	735
Arg Thr Ser Ser Pro Pro Ser Ser Pro Gln His Ser Pro Ala Leu Arg		
740	745	750
Asp Phe Gly Lys Pro Ser Asp Gly Lys Ala Ala Trp Thr Asp Ala Gly		
755	760	765
Leu Thr Ser Lys Lys Ser Lys Leu Glu Ser His Ser Asp Ser Pro Ala		
770	775	780
Trp Ser Leu Ser Gly Arg Asp Glu Arg Glu Thr Val Ser Pro Pro Cys		
785	790	795
Phe Asp Glu Tyr Lys Met Ser Lys Glu Trp Thr Ala Ser Ser Ala Phe		800
805	810	815
Ser Ser Val Cys Asn Gln Gln Pro Leu Asp Leu Ser Ser Gly Val Lys		
820	825	830
Gln Lys Ala Glu Gly Thr Gly Lys Thr Pro Val Gln Trp Glu Ser Val		
835	840	845
Leu Asp Leu Ser Val His Lys Lys His Cys Ser Asp Ser Glu Gly Lys		
850	855	860
Glu Phe Lys Glu Ser His Ser Val Gln Pro Thr Cys Ser Ala Val Lys		
865	870	880

Lys Arg Lys Pro Thr Thr Cys Met Leu Gln Lys Val Leu Leu Asn Glu
885 890 895
Tyr Asn Gly Ile Asp Leu Pro Val Glu Asn Pro Ala Asp Gly Thr Arg
900 905 910
Ser Pro Ser Pro Cys Lys Ser Leu Glu Ala Gln Pro Asp Pro Asp Leu
915 920 925
Gly Pro Gly Ser Gly Phe Pro Ala Pro Thr Val Glu Ser Thr Pro Asp
930 935 940
Val Cys Pro Ser Ser Pro Ala Leu Gln Thr Pro Ser Leu Ser Ser Gly
945 950 955 960
Gln Leu Pro Pro Leu Leu Ile Pro Thr Asp Pro Ser Ser Pro Pro Pro
965 970 975
Cys Pro Pro Val Leu Thr Val Ala Thr Pro Pro Pro Pro Leu Leu Pro
980 985 990
Thr Val Pro Leu Pro Ala Pro Ser Ser Ala Ser Pro His Pro Cys
995 1000 1005
Pro Ser Pro Leu Ser Asn Ala Thr Ala Gln Ser Pro Leu Pro Ile Leu
1010 1015 1020
Ser Pro Thr Val Ser Pro Ser Pro Ser Pro Ile Pro Pro Val Glu Pro
1025 1030 1035 1040
Leu Met Ser Ala Ala Ser Pro Gly Pro Pro Thr Leu Ser Ser Ser Ser
1045 1050 1055
Ser Ser Ser Ser Ser Ser Phe Ser Ser Ser Ser Ser Ser
1060 1065 1070
Ser Pro Ser Pro Pro Leu Ser Ala Ile Ser Ser Val Val Ser Ser
1075 1080 1085
Gly Asp Asn Leu Glu Ala Ser Leu Pro Met Ile Ser Phe Lys Gln Glu
1090 1095 1100
Glu Leu Glu Asn Glu Gly Leu Lys Pro Arg Glu Glu Pro Gln Ser Ala
1105 1110 1115 1120
Ala Glu Gln Asp Val Val Val Gln Glu Thr Phe Asn Lys Asn Phe Val
1125 1130 1135
Cys Asn Val Cys Glu Ser Pro Phe Leu Ser Ile Lys Asp Leu Thr Lys
1140 1145 1150
His Leu Ser Ile His Ala Glu Glu Trp Pro Phe Lys Cys Glu Phe Cys
1155 1160 1165
Val Gln Leu Phe Lys Asp Lys Thr Asp Leu Ser Glu His Arg Phe Leu
1170 1175 1180
Leu His Gly Val Gly Asn Ile Phe Val Cys Ser Val Cys Lys Lys Glu
1185 1190 1195 1200
Phe Ala Phe Leu Cys Asn Leu Gln Gln His Gln Arg Asp Leu His Pro
1205 1210 1215
Asp Lys Val Cys Thr His His Glu Phe Glu Ser Gly Thr Leu Arg Pro
1220 1225 1230
Gln Asn Phe Thr Asp Pro Ser Lys Ala His Val Glu His Met Gln Ser
1235 1240 1245
Leu Pro Glu Asp Pro Leu Glu Thr Ser Lys Glu Glu Glu Leu Asn
1250 1255 1260
Asp Ser Ser Glu Glu Leu Tyr Thr Thr Ile Lys Ile Met Ala Ser Gly
1265 1270 1275 1280
Ile Lys Thr Lys Asp Pro Asp Val Arg Leu Gly Leu Asn Gln His Tyr
1285 1290 1295
Pro Ser Phe Lys Pro Pro Phe Gln Tyr His His Arg Asn Pro Met

1300	1305	1310
Gly Ile Gly Val Thr Ala Thr Asn Phe Thr Thr His Asn Ile Pro Gln		
1315	1320	1325
Thr Phe Thr Thr Ala Ile Arg Cys Thr Lys Cys Gly Lys Gly Val Asp		
1330	1335	1340
Asn Met Pro Glu Leu His Lys His Ile Leu Ala Cys Ala Ser Ala Ser		
1345	1350	1355
Asp Lys Lys Arg Tyr Thr Pro Lys Lys Asn Pro Val Pro Leu Lys Gln		
1365	1370	1375
Thr Val Gln Pro Lys Asn Gly Val Val Val Leu Asp Asn Ser Gly Lys		
1380	1385	1390
Asn Ala Phe Arg Arg Met Gly Gln Pro Lys Arg Leu Asn Phe Ser Val		
1395	1400	1405
Glu Leu Ser Lys Met Ser Ser Asn Lys Leu Lys Leu Asn Ala Leu Lys		
1410	1415	1420
Lys Lys Asn Gln Leu Val Gln Lys Ala Ile Leu Gln Lys Asn Lys Ser		
1425	1430	1435
Ala Lys Gln Lys Ala Asp Leu Lys Asn Ala Cys Glu Ser Ser Ser His		
1445	1450	1455
Ile Cys Pro Tyr Cys Asn Arg Glu Phe Thr Tyr Ile Gly Ser Leu Asn		
1460	1465	1470
Lys His Ala Ala Phe Ser Cys Pro Lys Lys Pro Leu Ser Pro Pro Lys		
1475	1480	1485
Lys Lys Val Ser His Ser Ser Lys Lys Gly Gly His Ser Ser Pro Ala		
1490	1495	1500
Ser Ser Asp Lys Asn Ser Asn Ser Asn His Arg Arg Arg Thr Ala Asp		
1505	1510	1515
Ala Glu Ile Lys Met Gln Ser Met Gln Thr Pro Leu Gly Lys Thr Arg		
1520	1525	1530
Ala Arg Ser Ser Gly Pro Thr Gln Val Pro Leu Pro Ser Ser Phe		
1535	1540	1545
Arg Ser Lys Gln Asn Val Lys Phe Ala Ala Ser Val Lys Ser Lys Lys		
1555	1560	1565
Pro Ser Ser Ser Leu Arg Asn Ser Ser Pro Ile Arg Met Ala Lys		
1570	1575	1580
Ile Thr His Val Glu Gly Lys Pro Lys Ala Val Ala Lys Asn His		
1585	1590	1595
Ser Ala Gln Leu Ser Ser Lys Thr Ser Arg Ser Leu His Val Arg Val		
1605	1610	1615
Gln Lys Ser Lys Ala Val Leu Gln Ser Lys Ser Thr Leu Ala Ser Lys		
1620	1625	1630
Lys Arg Thr Asp Arg Phe Asn Ile Lys Ser Arg Glu Arg Ser Gly Gly		
1635	1640	1645
Pro Val Thr Arg Ser Leu Gln Leu Ala Ala Ala Asp Leu Ser Glu		
1650	1655	1660
Asn Lys Arg Glu Asp Gly Ser Ala Lys Gln Glu Leu Lys Asp Phe Ser		
1665	1670	1675
Tyr Ser Leu Arg Leu Ala Ser Arg Cys Ser Pro Pro Ala Ala Ser Tyr		
1685	1690	1695
Ile Thr Arg Gln Tyr Arg Lys Val Lys Ala Pro Ala Ala Gln Phe		
1700	1705	1710
Gln Gly Pro Phe Phe Lys Glu		
1715		

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<212> PRT
<213> Homo sapien

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Val Asp Lys Thr Arg Ile Gly Val Trp Ala Thr Lys Pro Ile Leu Lys
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Gly Lys Lys Phe Gly Pro Phe Val Gly Asp Lys Lys Lys Arg Ser Gln
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Val Lys Asn Asn Val Tyr Met Trp Glu Val Tyr Tyr Pro Asn Leu Gly
35 40 45
Trp Met Cys Ile Asp Ala Thr Asp Pro Glu Lys Gly Asn Trp Leu Arg
50 55 60
Tyr Val Asn Trp Ala Cys Ser Gly Glu Glu Gln Asn Leu Phe Pro Leu
65 70 75 80
Glu Ile Asn Arg Ala Ile Tyr Tyr Lys Thr Leu Lys Pro Ile Ala Pro
85 90 95
Gly Glu Glu Leu Leu Val Trp Tyr Asn Gly Glu Asp Asn Pro Glu Ile
100 105 110
Ala Ala Ala Ile
115

<210> 6
<211> 21
<212> PRT
<213> Homo sapien

<400> 6
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Leu Lys Asp Leu Gln
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<210> 7
<211> 22
<212> PRT
<213> Homo sapien

<400> 7
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1 5 10 15
Leu Gly Arg Arg Ala Arg
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<210> 8
<211> 391
<212> DNA

<213> Mus musculus

<220>

<221> CDS

<222> (1) . . . (390)

<400> 8

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Val Tyr Tyr Pro Asn Leu Gly Trp Met Cys Ile Asp Ala Thr Asp Pro
1 5 10 15

gag aag ggc aac tgg ctc cgc tat gtg aac tgg gct tgc tca gga gaa 96
Glu Lys Gly Asn Trp Leu Arg Tyr Val Asn Trp Ala Cys Ser Gly Glu
20 25 30

gaa cag aat tta ttt cca ctg gaa atc aac aga gcc att tac tat aaa 144
Glu Gln Asn Leu Phe Pro Leu Glu Ile Asn Arg Ala Ile Tyr Tyr Lys
35 40 45

acc tta aag cca atc gcg cct ggc gag gag ctc ctg gtc tgg tac aat 192
Thr Leu Lys Pro Ile Ala Pro Gly Glu Leu Leu Val Trp Tyr Asn
50 55 60

ggg gaa gac aac ccc gag ata gca gct gcg att gag gaa gag cga gcc 240
Gly Glu Asp Asn Pro Glu Ile Ala Ala Ala Ile Glu Glu Glu Arg Ala
65 70 75 80

agc gcc cg^g agc aag cg^g agc tcc cc^g aag agc cg^g aga gg^g aag aag 288
Ser Ala Arg Ser Lys Arg Ser Ser Pro Lys Ser Arg Arg Gly Lys Lys
85 90 95

aaa tca cag gag aat aaa aac aaa gg^c atc aga acc cag gct gca gc^g 336
Lys Ser Gln Glu Asn Lys Asn Lys Gly Ile Arg Thr Gln Ala Ala Ala
100 105 110

cg^g aag gc^g agc gag ctg gac tcc acc tct gca aac atg agg gg^c tct 384
Arg Lys Ala Ser Glu Leu Asp Ser Thr Ser Ala Asn Met Arg Gly Ser
115 120 125

gca gaa g 391
Ala Glu
130

<210> 9

<211> 130

<212> PRT

<213> Mus musculus

<400> 9

Val Tyr Tyr Pro Asn Leu Gly Trp Met Cys Ile Asp Ala Thr Asp Pro
1 5 10 15
Glu Lys Gly Asn Trp Leu Arg Tyr Val Asn Trp Ala Cys Ser Gly Glu

20	25	30
Glu Gln Asn Leu Phe Pro Leu Glu Ile Asn Arg Ala Ile Tyr Tyr Lys		
35	40	45
Thr Leu Lys Pro Ile Ala Pro Gly Glu Glu Leu Leu Val Trp Tyr Asn		
50	55	60
Gly Glu Asp Asn Pro Glu Ile Ala Ala Ala Ile Glu Glu Glu Arg Ala		
65	70	75 80
Ser Ala Arg Ser Lys Arg Ser Ser Pro Lys Ser Arg Arg Gly Lys Lys		
85	90	95
Lys Ser Gln Glu Asn Lys Asn Lys Gly Ile Arg Thr Gln Ala Ala Ala		
100	105	110
Arg Lys Ala Ser Glu Leu Asp Ser Thr Ser Ala Asn Met Arg Gly Ser		
115	120	125
Ala Glu		
130		

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<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 10
tgtaaaacga cggccagt 18

<210> 11
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 11
caggaaacag ctatgacc 18

<210> 12
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 12
gagctcagca aaatgtcgtc 20

<210> 13
<211> 20
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<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 13

caagtcggcc ttctgctttg

20

<210> 14

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<212> DNA

<213> Artificial Sequence

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<223> synthetic primer

<400> 14

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20

<210> 15

<211> 20

<212> DNA

<213> Artificial Sequence

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<223> synthetic primer

<400> 15

gtgatgagtg tccacccccc

20